SHEDDING MORE LIGHT ON THE BENEFITS OF **DARKNESS** IN CHICKEN PRODUCTION

The *Raised by a Canadian Farmer* Animal Care Program, based on the **Code of Practice for the Care and Handling of Hatching Eggs, Breeders, Chickens and Turkeys (2016)** developed by the National Farm Animal Care Council, includes a requirement that at least 4 consecutive hours of darkness be provided daily from day 5 up to a minimum of 7 days prior to catching. The Code also includes a recommended practice for gradually providing at least 6 continuous hours of darkness from day 3.

Chicken Farmers of Canada works with partners throughout the value chain to provide them the assurance that farmers value the animals in their care and are committed to doing the right thing. This ultimately helps us expand the *Raised by a Canadian Farmer* brand, with the goal of leading and growing a trusted and sustainable chicken sector.

WHY PROVIDING DARK PERIODS IS THE "BRIGHT" THING TO DO

There has been an abundance of research demonstrating the benefits of a dark period (or a shorter photoperiod), both for production and bird welfare.

BIRD WELFARE OUTCOMES AND QUALITY OF SLEEP

- Compared to 1 or 10 hours of darkness daily, providing between 4 and 7 hours results in more active broilers that spend more time eating[2].
- Time spent performing comfort and exploratory behaviours, such as dustbathing, feather ruffling, preening, stretching, and wing flapping, is nearly zero when only 1 hour of dark is provided, but increases linearly when provided 4 to 7 hours of darkness. These are all behaviours performed in the absence of distress and suffering, when all basic needs are met, and are therefore considered to be important indicators of welfare[2].
- Mortality and culls due to leg weakness, and the number of birds considered to be in pain via gait scoring, decreased with increasing dark periods (between 4-10 hours daily)[2].
- Darkness benefits birds by allowing them to sleep and develop circadian rhythms, which is important in immune function, growth rate, digestibility (improving feed efficiency), reduced lameness, and general health[2,5].

FEED CONSUMPTION AND FEED EFFICIENCY

- When birds have learned that darkness will come at a certain time each day, they will consume a large amount of feed prior to the onset of darkness. Utilizing longer periods of darkness results in a larger amount of feed consumed, and, regardless of the length of that dark period (up to 10 consecutive hours), the gastrointestinal tract empties at approximately the same amount of time prior to lights on. This results in birds with heavier crops and gizzards, which may improve their function and digestibility of feedstuffs. In addition, feedstuffs remain in the gastrointestinal tract for a longer time, resulting in improved digestion. These factors can explain the improved feed efficiency with dark periods[3].
- Providing 6 or 7hrs of darkness per day results in greater feed intake and feed efficiency than providing 1 or 2hrs of darkness per day[2,4].

TIMING AND SPEED OF GROWTH

» A dark period allows controlled growth early in life which gives skeletal and metabolic systems a chance to develop before the birds get heavy[1].

» A dark period supports faster growth during the mid to later grow-out period so the resulting birds are as heavy or heavier than those not allowed a dark period[1].

» When fed a mash diet, broilers provided with 4 hours of darkness were significantly heavier at 33 days of age compared to those raised with 1 hour of darkness[6].

MORTALITY AND CULLS

» Longer dark periods result in less mortality and culls, regardless of slaughter age; increasing dark periods beyond 7 hours did not result in further mortality reductions[2].

NEAR-CONTINUOUS LIGHT

» Providing broilers with 23 hours of light throughout the grow-out period has a negative effect on growth rate, feed intake and feed efficiency, mortality, and broiler welfare[2].

In summary, providing between 4 and 7 hours of continuous darkness daily is associated with better feed efficiency, reduced mortality, increased welfare, and heavier body weights at market age, which should all result in increased profits for producers.

BEST PRACTICES FOR SUCCESS WITH A LIGHTING PROGRAM

Appendix E in the **Code** describes management practices that will help in getting the best outcomes possible with a lighting program:

» Use a dawn to dusk system. This mimics natural day/night cycles and will also reduce crowding at the feeder if it is an issue.

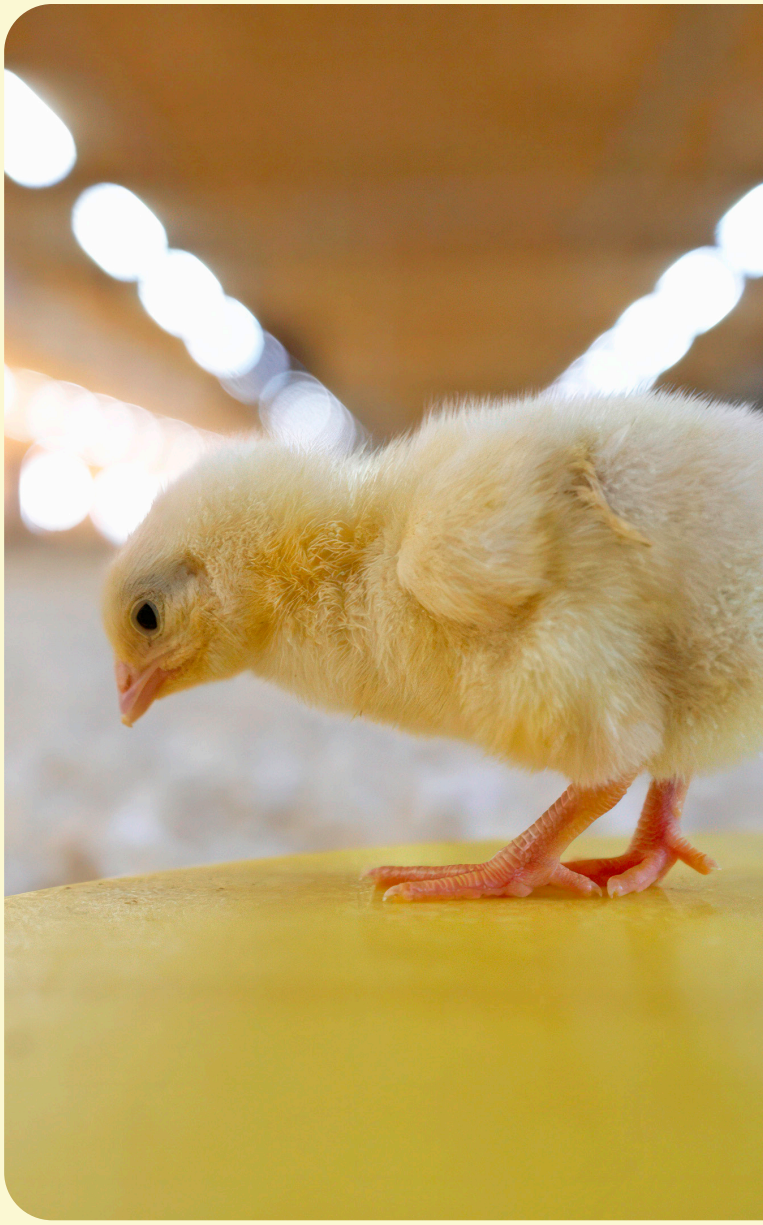
» Always ensure adequate feeder space and increase as necessary. This is especially important when feeding lower density/mash feeds.

» When increasing the hours of darkness, do so gradually over several days, by approximately one hour per day. Similarly, make changes to light intensity over several days: abrupt changes to daylength or light intensity can reduce feed intake by up to 20%.

- Always add hours of darkness to start the morning period (when lights come on), and never in the evening period (when lights go off). If we change what time the lights go off in the evening, the birds don't get the large feeding described above.

» Providing hours of darkness in one period (as required in the Code), as opposed to several shorter periods, may allow higher quality sleep and reduced mortality.

» Continue the lighting program right up until shipping. Reducing dark periods before shipping may eliminate some of the production benefits of the dark period.



TAKE HOME MESSAGES

» Constant or near-constant light results in poor production and welfare outcomes and is not permitted in the Animal Care Program.

» Compared to the previous practice of providing just one hour of darkness, providing four to seven hours of darkness daily improves all welfare parameters, improves growth rate, lowers mortality and feed conversion, and results in bird that are as heavy, or heavier at market age.

» There is no one lighting program that will suit all farms. The inclusion of four to seven hours of darkness is most important and beyond that farmers should adjust their program to suit the needs of their individual farms and flocks.

"We grow Cobb birds on commercial pelleted feed and have found good results by gradually increasing the length of the dark period over the first nine days. Day 1 and 2 there is 1 hr of dark provided and we gradually increase the dark period until we reach 8 hrs by day 9 and use that right through to shipping. Light intensity is reduced around day 7. We have found this schedule has reduced leg culls, plant condemns, and mortality in our birds compared to near-constant light, with no impact on final weights."

— Warren, chicken farmer in Nova Scotia

"We have implemented a lighting program that we find to be optimal for both animal welfare and production outcomes. The first two days have 2 hours of dark, day 3-4 have 6 hours of dark, and day 5 until shipping is 10 hours of dark. With this schedule we have found that condemnations are less, feed conversion is lower, and there are fewer mortalities. We find the chickens have a better quality sleep and are then more active and healthy during the light periods."

— Pierre-Luc, chicken farmer in Quebec

"Several tests have been done at the farm to find an optimal lighting program. Multiple factors are to be considered such as age of birds at processing, energy and protein levels in feed and genetics. It's also important not to make conclusions after testing just once. One test is not conclusive, but after multiple tests the results were clear.

For example, for birds of 40 days old at processing, on a high energy and protein diet, the hours of full darkness were increased from 4 to 9 hours. After multiple tests, it was found that feed conversion was significantly lower with longer hours of dark. Final weights were a bit lower, but so were mortality and condemns. Overall performances have shown that it was worth it to provide longer dark periods. Similar results were seen on birds of 30 days old, also on high energy and protein diet, when comparing performance of 4 hours dark/day versus 6.

When comparing genetics, Cobb birds tend to benefit more from longer periods of darkness."

— Marco, chicken farmer in New Brunswick

Works Cited

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